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OIL AND GAS DIVISION

To: John J. Tintera, Deputy Assistant Director, Site Remediation Team

From: Maria A. Remmert, M.S., DABT, Toxicologist, Site Remediation Team *MAR*

Date: September 8, 1997

Subject: Interim Report on Comparison of Available Split Sample Data and Review of Data from Chevron's Phase III Investigations - Kennedy Heights, Harris County

As requested, results of analyses of the split samples collected by Chevron and the Railroad Commission of Texas (RRC) were compared to determine differences between the two sets of data. In addition, a preliminary review of the entire set of Chevron data available from the Phase III investigations was conducted.

Samples for analyses were collected during Chevron's Phase III investigation conducted between December 1996 and March 1997. Three laboratories analyzed the samples, ADL on behalf of Chevron, and LCRA and RRC on behalf of the RRC. The split samples were chosen by the RRC randomly. Although split samples were also collected by the residents, the comparison does not include results of the analyses by the residents since these data have not been received by the RRC.

Results of the analyses were also compared to available health-based criteria including screening values developed by the Agency for Toxic Substances and Disease Registry (ATSDR), the Texas Natural Resource Conservation Commission Petroleum Storage Tank Program, and the U.S. EPA Region VI Human Health Media Specific Screening Levels.

Comparison of Results of Analyses Conducted by the Lower Colorado River Authority (LCRA) Lab under contract with the Railroad Commission of Texas

Split samples analyzed by LCRA lab included SB-SE 8, MW-SE6, SB-NW13, SB-NE34A, SB-NE30, and MW-NE2. Samples were analyzed for semivolatiles and volatiles by Methods 8270 and 8260, respectively. Review of reports for these analyses indicates that there are no major differences between results by ADL (Chevron's contractor lab) and LCRA (RRC contractor lab). The only differences involve the detection of compounds that are common laboratory contaminants. For example, acetone, methylene chloride and phthalates were detected in some instances by one lab and not the other.

Comparison of the Results of Analyses Conducted by the RRC Lab

The RRC lab analyzed thirty eight samples (thirty one soil samples (two from spoils) and seven groundwater samples). Several factors affected the comparison of this set of split sample data: 1) different methods of analysis were used by the labs to analyze for metals and TPH (Chevron used Method 418.1 to analyze for TPH, while the RRC lab used method 5520); 2) the data for magnesium, chloride, nitrate, potassium, sulfate, and sodium were compared because the labs used different methods of analyses; 3) certain parameters were analyzed by the RRC and not Chevron (electrical conductivity, TCLP metals, carbonate, bicarbonate, pH, and oil and grease); and 4) Chevron carried out the Synthetic Precipitation Leaching Procedure test, while the RRC lab carried out the TCLP test.

Review of the data indicates that for fifteen of the split samples, the RRC lab reported higher concentrations of TPH than the Chevron contractor, while for nine samples, the Chevron contractor reported higher concentrations than the RRC lab.

Preliminary Evaluation of Chevron data - Phase III - Report "Results of Field Investigations" Dated April 3, 1997 and Risk Assessment Report dated April 25, 1997

Review of these reports indicated that the practical quantitation limits (PQLs) in water were not low enough to detect benzo(a)pyrene (B(a)p) at the drinking water standard or Maximum Contaminant Level (MCL). The PQL was approximately one order of magnitude higher than the MCL for B(a)p. In addition, the PQL for b(a)anthracene, dibenzo(a,h)anthracene and benzo(b)fluoranthene in water (either groundwater or drinking water) were higher than the established health based criteria (ATSDR, TNRCC PST, EPA Region VI Human Health Media Specific Screening Levels) for these compounds. However, except for B(a)P, none of these compounds has an MCL. The PQLs for PAHs in soil were below health-based criteria.

In addition, the reported PQL for arsenic was slightly higher than the drinking water standard or MCL. Based on the historical use of the site and the results of soil sampling, I would not expect arsenic to be a potential chemical of concern. In addition, metals were not analyzed for in drinking water, but were analyzed for in groundwater.

Chevron's consultant used the Toxicity Equivalent Concentration (TEQs) approach in their risk assessment. This approach assigns potencies to the carcinogenic polycyclic aromatic hydrocarbons (PAHs) relative to the potency of B(a)p. Although Chevron used TNRCC risk reduction rules for their limited risk assessment, TNRCC's Appendix II tables from the risk reduction rules do not include media specific concentrations for the PAHs that have been classified as carcinogenic. As such, Chevron's consultant developed media specific concentrations for B(a)p and compared those to B(a)p TEQ for the site. TNRCC equations were used to develop these health protective soil concentrations. Please note that the RRC has requested that dermal exposure to PAHs also be considered in the development of these health protective soil concentrations for PAHs since this pathway was not originally included.

Conclusions

Differences between the results reported by the labs could be attributed to the detection of common laboratory contaminants and differences in the methods of analyses and detection limits.

Review of the data collected during the Phase III investigation indicated that very few individual compounds were detected. Of the individual compounds that were detected during Phase III investigations, none were detected at concentrations that exceeded available screening health based criteria for soil or water from the TNRCC PST Program, the Agency for Toxic Substances and Disease Registry [ATSDR], and EPA Region VI.

Recommendations

- 1) Request the significance of the difference between the MCL and the PQL for B(a)p.
- 2) Ask Chevron to consider how TPH data can be used to evaluate potential risks.

RECOMMENDED AND REQUESTED RESPONSES TO RCT re KENNEDY HEIGHTS

Item	RCT Issues	Suggested Responses
Priority 1 Issues		
1	RCT needs easily understood maps to illustrate the distribution of PAHs, BTEX, Metals, and perhaps TPH (0-3").	CSI will provide maps showing sample locations and exceedances for PAHs by TEQ analysis, TPH by Massachusetts method, BTEX, and metals as appropriate. The risk implications of these observations will be discussed.
2	RCT needs a map showing locations of background samples.	Map will be provided.
3	Expand discussion of (b) (6) (including debris and its effect on delineation). Also discuss analysis of bore hole water collected at this address.	CSI will discuss the evaluation of impacts to soil at (b) (6) and the effects of debris on the delineation at this address. The issues of bore-hole water at this address will be discussed as part of item 5 below.
4	RCT needs a map of Utility Pathways at KHS.	Map will be provided.
5	Bore Hole Water. Note: Chevron may have analyzed of a bore hole water sample from SBNE30 prior to conversion to MWNE30.	Discussion of the issues associated with bore-hole water samples will be expanded.
6	Include dermal exposures and inhalation exposures to contaminated soils.	Dermal exposure and inhalation of PAH vapor from soil particulate to PAH-contaminated soil particulate will be included in the estimate of total intake for calculation of the SAI-Res for benzo(a)pyrene (used in the TEQ evaluation of PAHs in soil).
7	Consider worker exposures.	Discussion of health risks associated with exposures to workers at Kennedy Heights will be expanded.
8	Address meaning of "insignificant".	A more precise summary of the results and conclusions of the risk assessment will be provided.
9	Methane -- why not in the risk assessment.	A discussion will be provided explaining that because methane in soil is considered to be a safety issue, not a health risk concern, it was not included in the health risk assessment performed by CSI.
10	Discuss vertical and horizontal migration of contaminants in soil.	The question of vertical migration and horizontal migration of contaminants from the former crude oil storage tanks will be addressed as part of item 1 above.
11	MWSE6 -- bis(2-ethylhexyl)phthalate concentration > MSC.	CSI confirms that the concentration of bis(2-ethylhexyl)phthalate exceeds the MSC in the sample. This chemical is used as a
12	Trichloroethane -- lab contaminant?	CSI will expand our discussion of trichloroethane to indicate that while this chemical is not listed as a common laboratory contaminant by EPA, it is not a constituent of crude oil.
13	QA/QC reports re ITS & ADL.	Information will be provided.

RECOMMENDED AND REQUESTED RESPONSES TO RCT 73 KENNEDY HEIGHTS

Item	RCT Issues	Suggested Responses
14	Cross references in the risk assessment.	CSI will review the text of the risk assessment report to make sure data are clearly cross referenced.
15	Group B -- identify sources of data for each group.	CSI will modify its summary table to identify the source of each PAH data set used in the calculation of TEQs.
16	Send background spreadsheets to Maria Remmert.	Background spreadsheets were sent to Maria Remmert.
17	Discussion of 8270-M.	CSI will expand discussion of the analysis of PAHs by Arthur D. Little's 8270-M method, and why the results by this method are not comparable to the 8270 data that comprise the majority of PAH information collected in the subdivision.
18	Drinking Water -- expand on discussion of why excluded. Discussion of analysis of DW5.	CSI will expand the discussion describing the failure to find contaminants in drinking water samples collected at KHS, such that this medium was not included as part of the risk assessment.
Priority 2 Issues		
19	RCT would like a written perspective on use of risk assessment. Provide expanded discussion of historical and successful use. Provide framework.	CSI will provide a historical perspective of the use of risk assessment, with the intent of providing a framework on which the findings of the present study may be better understood.
20	How were non-detects handled?	CSI will expand the discussion of how non-detects and outliers were handled in each part of the risk assessment.
21	Q: Discuss Lupus and how RA addresses systemic effects. Carcinogen vs. noncarcinogen. RCT may let TDH address all epidemiological issues.	CSI will discuss how noncarcinogenic endpoints (e.g., lupus erythematosus in man) are addressed in the risk assessment process. The discussion will also consider epidemiological results in the risk assessment process.
22	Background discussion. Q: Enough samples?	CSI will expand the discussion of the adequacy of samples collected by Chevron for the purpose of defining background.
23	Background for methane.	Discussion will be provided.
24	Effect of outliers on UTL calculations -- expand discussion.	Outliers will be discussed in item 22 above.
25	Bradley reference to Maria.	Paper will be provided

In addition, the RRC has requested that Chevron address three additional issues

- 1) Discussion of how the TPH data can be used to evaluate potential risks
- 2) Discussion of correlation, if any, between semiVOCs, VOCs and TPH
- 3) Practical Quantitation Limit for benzo(a)pyrene in water